

**WHAT IS CLAIMED IS:**

1. An MEMS device using an SOI wafer, comprising:  
a first silicon layer;  
5 an insulation layer formed on the first silicon layer;  
a second silicon layer formed on the insulation layer;  
a protective layer formed on the second silicon layer;  
and  
a ground hole extending from an upper portion of the  
10 protective layer to the first silicon layer and having a  
conductive material layer therein.
2. The MEMS device as set forth in claim 1, wherein the  
second silicon layer has a predetermined structure thereon.
- 15 3. The MEMS device as set forth in claim 2, wherein the  
protective layer includes a vacant space under the structure.
4. The MEMS device as set forth in claim 2, wherein the  
20 ground hole is completely filled with the conductive material  
layer, whereby the ground hole is electrically connected from  
a lower portion thereof to an upper portion of the protective  
layer.
- 25 5. The MEMS device as set forth in claim 1, wherein the

conductive material is formed along an inner surface of the ground hole by using a deposition process or a plating process, whereby the ground hole is electrically connected from a lower portion thereof to an upper portion of the protective layer.

6. A method for fabricating and grounding an MEMS device using an SOI wafer, comprising:

- a first step of preparing a first silicon layer;
- 10 a second step of forming an insulation layer on the first silicon layer;
- a second step of forming a second silicon layer on the insulation layer;
- a fourth step of forming a protective layer on the
- 15 second silicon layer;
- a fifth step of forming a signal hole and a ground hole in the protective layer and extending the ground hole to the first silicon layer through the second silicon layer and the insulation layer; and
- 20 a sixth step of forming a conductive material in the ground hole.

7. The method as set forth in claim 6, wherein the fifth step includes:

- 25 applying a dry film resist on the protective layer while

uncovering the ground hole;

extending the ground hole to the first silicon layer by etching the second silicon layer and the insulation layer in the ground hole.

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8. The method as set forth in claim 6, wherein the fifth step includes:

applying a dry film resist on the protective layer while uncovering the ground hole;

10 extending the ground hole to the first silicon layer through the second silicon layer and the insulation layer by injecting sand powder into the ground hole.

9. The method as set forth in claim 8, wherein the sand  
15 powder is injected into the ground hole through sand blaster nozzles.

10. A method for fabricating and grounding an MEMS device using an SOI wafer, comprising:

20 a first step of preparing a first silicon layer;

a second step of forming an insulation layer on the first silicon layer;

a third step of forming a second silicon layer on the insulation layer and forming a plurality of slits and a  
25 predetermined structure on the second silicon layer, wherein

the slits are formed to penetrate the second silicon layer at a location where a ground hole is to be formed;

a fourth step of forming a protective layer on the second silicon layer;

5 a fifth step of forming a signal hole and a ground hole in the protective layer and extending the ground hole to the first silicon layer through the second silicon layer and the insulation layer; and

a sixth step of forming a conductive material layer in  
10 the ground hole.

11. The method as set forth in claim 10, wherein the fifth step comprises etching the second silicon layer and the insulation layer in the ground hole, thereby extending the  
15 ground hole to the first silicon layer.

12. The method as set forth in claim 10, wherein the fifth step comprises injecting sand power into the ground hole, thereby extending the ground hole to the first silicon  
20 layer through the second silicon layer and the insulation layer.

13. The method as set forth in claim 12, wherein the sand powder is injected into the ground hole through sand blaster  
25 nozzles.